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EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1764

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7

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/060,737

Applicant(s)

HUANG ET AL.

Examiner

Jennifer A. Leung

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-19, drawn to a micro-machined chemical-mixing device, classified in class 422, subclass 188+.
  - II. Claim 20, drawn to a method for releasing energy from an outlet of a chamber of a micro-machined chemical mixing device, classified in class 431, subclass 2.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the apparatus as claimed can be used to practice another and materially different process, such as the generation of hydrogen for fuel cell operation.

2. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, their recognized divergent subject matter, and the search required for Group I not required for Group II, restriction for examination purposes as indicated is proper.
3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the

application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

4. During a telephone conversation with Mr. Charles Berman on February 18, 2003 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-19. Affirmation of this election must be made by applicant in replying to this Office action.

5. Claim 20 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

#### ***Specification and Drawings***

6. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 1, it is unclear as to the structural relationship of "an initiator" (line 6) to the other elements of the apparatus.

With respect to claim 3, it is unclear as the relationship of "an inlet" (line 2) to "an inlet" set forth in claim 2, line 1. Likewise in claim 14, line 2.

With respect to claims 4 and 5, the language of the claim is directed to a method limitation which renders the claim vague and indefinite, as it is unclear as to what structural elements the applicants are attempting to recite since “the oxidizer” is not an element of the apparatus. Also, in claim 5, “liquid oxidizer” lacks proper positive antecedent basis.

With respect to claim 8, it is unclear as to the structural relationship of “a plurality of laminae”, “at least one inlet port”, “at least one outlet port”, and “a plurality of channels” to the other elements of the apparatus.

With respect to claim 9, “thin” is a relative term and is therefore considered vague and indefinite. See also claim 10, line 2.

With respect to claim 10, “the micro-chamber” and “the micro-initiator” lack proper positive antecedent basis. Furthermore, the phrase, “such material being selected from the group comprising...” is an improper Markush clause because it is not of closed language, and should therefore be changed to -- such material being selected from the group consisting of --.

With respect to claim 11, “liquid phase chemicals” (line 2) lacks proper positive antecedent basis.

With respect to claims 12-19, the recitation of “The micro device...” in the preamble lacks proper positive antecedent basis. Also in claim 19, line 1, “the micro device”.

With respect to claim 15, it is unclear as to what is intended by, “or other high-temperature performance materials” and where it is disclosed in the specification. Furthermore, “high” is a relative term and is therefore considered vague and indefinite.

With respect to claims 17 and 18, it is unclear as to the structural relationship of “temperature sensors” and “pressure sensors” to the other elements of the apparatus.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-5, 8-9, 11 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Wegeng et al. (U.S. 5,811,062).

With respect to claim 1, Wegeng et al. disclose an apparatus for accomplishing heat transfer and/or power conversion, or chemical processes including conversions and separations, wherein the apparatus is formed by a plurality of microscale elements operating in parallel (column 1, lines 14-21). Wegeng et al. disclose that a variety of systems may be generated using the microscale elements, depending on the intended use of the apparatus, and further disclose a specific example of a system embodiment, wherein “a microchannel combustor [is] placed on a microchannel evaporator for vaporizing a working fluid for a heat engine,” (generally, column 5, line 40 to column 6, line 39; specifically, column 6, lines 1-3). Wegeng et al. disclose that such an apparatus may comprise (generally, column 9, line 65 to column 12, line 11; FIG. 9):

- Walls forming a chamber (first laminate reactor **902**) having an outlet **906** (column 10, line 63 to column 11, line 9);
- An evaporator (second laminate **912**) adjacent to the chamber **902** for evaporating liquid and introducing the evaporated liquid into the chamber **902** (i.e. as “working fluid”; column 11, lines 9-31);
- A liquid feed path **916** for supplying the liquid to the evaporator **912**; and

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- An initiator for providing initial or sustained energy to react the evaporated liquid thereby causing energy transfer through the outlet **906** (column 10, lines 13-19; column 14, example 4).

With respect to claim 2, Wegeng et al. further disclose the apparatus comprises an inlet **904** for introducing an oxidizer (i.e. oxygen) into the chamber **902**, and the initiator provides energy to combust the mixture of the evaporated liquid and the oxidizer (FIG. 9; column 10, lines 13-19; column 11, lines 24-30).

With respect to claim 3, Wegeng et al. further disclose the oxidizer is a gas (i.e. oxygen) introduced to the chamber through an inlet **904** passing through the walls of the device (FIG. 9; column 10, lines 63-66).

With respect to claim 4, no further structural limitations are recited, since “the oxidizer” is not an element of the apparatus and the selection of “air supplied from outside the device” is only a matter of intended use. Therefore, the apparatus of Wegeng et al. meets the claims.

With respect to claim 5, no further structural limitations are recited and therefore the apparatus of Wegeng et al. meets the claim. In any event, Wegeng et al. further disclose a liquid oxidizer (i.e. water) evaporated into the chamber **902** (i.e. as a working fluid) by the evaporator **912**, wherein the liquid oxidizer is supplied to the evaporator **912** by the liquid feed path **916** (FIG. 9; column 11, lines 9-30).

With respect to claim 8, Wegeng et al. further disclose the apparatus comprises a plurality of laminae (Figures, Abstract), and at least one inlet port **904**, **916** and at least one outlet port **906**, **918**, wherein a chemical entering the inlet port flow **904**, **916** through a plurality of channels **908**, **912** (FIG. 9; column 10, line 63 to column 11, line 23).

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With respect to claim 9, Wegeng et al. further disclose that the apparatus may be formed of thin film based materials (i.e. a coating; column 10, line 66 to column 11, line 8; claims 7, 8, 9, 10).

With respect to claim 11, Wegeng et al. further disclose the evaporator **912** is located substantially adjacent to and gaseously connected to the chamber **902** (column 6, lines 1-3; column 11, lines 9-31; FIG. 9).

With respect to claim 19, Wegeng et al. further disclose no valves, chemical pumps, pressurized chemical lines or pumps (FIG. 9).

Instant claims 1-5, 8-9, 11 and 19 structurally read on the apparatus of Wegeng et al.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).



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9. Claims 6, 10 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wegeng et al. (U.S. 5,811,062) in view of Harbster et al. (U.S. 5,595,712).

With respect to claim 6, Wegeng et al. further disclose the apparatus may comprise any solid material, preferably a metal, ceramic, or semiconductor material (column 4, lines 31-33). Although Wegeng et al. is expressly silent as to material comprising silicon, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select silicon for the material of the apparatus of Wegeng et al., on the basis of suitability for the intended use and absent showing any unexpected results therefore, since silicon is a conventionally known semiconductor material. Furthermore, Harbster et al. evidence the conventionality by teaching a device comprising a plurality of laminae **100, 200, 300**, wherein the laminae are preferably formed of silicon (column 4, lines 33-53; column 9, lines 11-40).

With respect to claim 10, Wegeng et al. are silent as to the apparatus being formed of a thin film based quality material, such material being selected from the group consisting of silicon based, ceramics and glass materials. Harbster teach an apparatus comprising a plurality of laminae forming mixing and reaction channels (Abstract), wherein a thin film material, selected according to the operating temperature (column 9, lines 11-19), may be deposited on the surfaces of the laminae, such material comprising ceramic material, silicon based materials, or glass materials (column 9, lines 19-40). It would have been obvious for one of ordinary skill in the art at the time the invention was made to select a thin film based quality material, as taught by Harbster, for the apparatus of Wegeng et al., on the basis of suitability for the intended use and absent showing any unexpected results therefore, because the specified materials improve compatibility of apparatus to the chemicals being mixed and reacted therein.

With respect to claims 17-18, Wegeng et al. further disclose the importance of reaction control (column 10, lines 1-11, 42-62) but are silent as to the control means comprising specifically “temperature sensors for feedback temperature control” and “pressure sensors for feedback pressure control”. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide temperature and/or pressure sensors to the apparatus of Wegeng et al., since such sensors will be inherent to any control system, and furthermore, the use of such sensors for feedback temperature and/or pressure control is conventionally known in the art, as evidenced by Harbster (column 10, lines 1-10).

10. Claims 7 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wegeng et al. (U.S. 5,811,062).

With respect to claim 7, Wegeng et al. further disclose an embodiment useful for electrochemical unit operation, wherein the apparatus may further comprise conductive grooved sheets **107**, **110** with a permeable membrane **1100** in between, forming what is inherently a “membranous pad containing a plurality of holes and grooves” (column 11, lines 32-49). Although Wegeng et al. is silent as to specifically providing the membranous pad for the evaporator, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide the membranous pad to the evaporator in the apparatus of Wegeng et al. in order to enable the apparatus for electrochemical unit operation, on the basis of suitability for the intended use and absent showing any unexpected results thereof.

With respect to claim 12, Wegeng et al. further disclose that a laminate layer may comprise a plurality of headers **5** and/or connections **8**, which would substantially comprise “at least two separate inlets” (FIG. 1, 2a, 2b; column 4, line 61 to column 5, line 9). Therefore, it

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would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide at least two separate inlets for the evaporator (i.e. laminate layer 912) in the apparatus of Wegeng et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof. *St. Regis Paper Co. v. Beemis Co. Inc.* 193 USPQ 8, 11 (1977); *In re Harza* 124 USPQ 378 (CCPA 1960).

With respect to claim 13, the same comments with respect to Wegeng et al. apply (see claim 12 above), and therefore, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to provide yet a third separate inlet to the evaporator in the modified apparatus of Wegeng et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof. In any event, duplication of part was held to have been obvious. *St. Regis Paper Co. v. Beemis Co. Inc.* 193 USPQ 8, 11 (1977); *In re Harza* 124 USPQ 378 (CCPA 1960).

With respect to claim 14, Wegeng et al. further disclose the oxidizer is a gas (i.e. oxygen) supplied from outside the device and introduced to the chamber 902 through an inlet 904 passing through the walls of the chamber 902 (FIG. 9; column 10, lines 63-66).

11. Claims 15-16 rejected under 35 U.S.C. 103(a) as being unpatentable over Wegeng et al. (U.S. 5,811,062) in view of Hosaka et al. (U.S. 5,403,184).

With respect to claims 15 and 16, Wegeng et al. further discloses an example of an “electronic ignitor” for the initiator (column 14, Example 4), but are silent as to whether the initiator may comprise “an array of platinum or other high-temperature performance materials” or “free-standing wires”. Hosaka et al. teach a chemical reaction apparatus wherein an ignition heater 9 comprising a fine platinum wire is provided to heat a combustion reaction (substantially

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the array of platinum or free-standing wires as instantly claimed; column 8, lines 40-49). It would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an array of platinum or other high-temperature performance materials, or free-standing wires, for the initiator in the apparatus of Wegeng et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, since such initiator means are known in the art, as taught by Hosaka et al. and furthermore, substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

12. Claims 1-6, 8-11 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masel et al. (U.S. 6,193,501).

With respect to claim 1, Masel et al. (FIG. 2) disclose a device comprising:

- Walls forming a chamber **16** having an outlet **28, 31** (column 3, lines 4-24);
- A pre-heat section **24** (column 5, lines 56-67) adjacent to the chamber **16** for pre-heating a fuel and introducing the pre-heated fuel into the chamber **16**;
- A fuel feed path **22** (FIG. 3; column 5, lines 42-47) for supplying the fuel to the pre-heat section **24**; and
- An initiator **44** (column 6, lines 17-26) for providing initial or sustained energy to react the pre-heated fuel, thereby causing energy transfer through the outlet **28, 31**.

Although Masel et al. are expressly silent as to whether said pre-heat section **24** is specifically an “evaporator”, Masel et al. further disclose that the pre-heat section **24** functions to raise the temperature of the fuel from ambient to the initiation temperature, and therefore must be

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designed to raise the temperature (column 5, lines 56-59). Therefore, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an appropriate temperature for the pre-heat section, such that a given fuel was evaporated, in the apparatus of Masel et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

Furthermore, although Masel et al. are expressly silent as to whether the fuel may comprise a liquid fuel, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select a liquid fuel for the fuel in the apparatus of Masel et al., on the basis of suitability for the intended use and absent showing any unexpected results, since the type of fuel selected is merely a matter of intended use. The apparatus of Masel et al., which comprises substantially the structural elements as recited, would therefore be capable of processing a liquid fuel. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

With respect to claim 2, Masel et al. further disclose an inlet **20** (FIG. 2, 3) for introducing an oxidizer (i.e. oxidant) into the chamber **16**; and disclose that the initiator **44** provides energy to combust the mixture of fuel and oxidizer (column 6, lines 17-26).

With respect to claims 3-4, Masel et al. disclose the oxidizer is a gas, such as oxygen (column 3, lines 8-12), introduced to the chamber 16 through an inlet 20 passing through the walls of the device (FIG. 2, 3). Although Masel et al. are silent as to whether the oxidizer may comprise specifically "air supplied from outside the device", the apparatus still meets the claims, because no further structural limitations are recited and "the oxidizer" is not an element of the apparatus but merely a matter of intended use. The apparatus of Masel et al. is capable of supplying a gaseous oxidizer, and is therefore capable of supplying air.

With respect to claim 5, no further structural limitations are recited, and therefore the apparatus of Masel et al. meets the claim. In any event, although Masel et al. are silent as to whether the oxidizer may comprise specifically a liquid oxidizer, the selection of oxidizer is merely a matter of intended use, and it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select a liquid oxidizer for the oxidizer in the apparatus of Masel et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof.

With respect to claim 6, Masel et al. further disclose the device may be made of silicon (i.e. silicon carbon or similar suitable materials; column 3, lines 45-59; column 5, lines 9-35).

With respect to claim 8, Masel et al. further disclose the device comprises a plurality of laminae (FIG. 1, 3) and at least one inlet port 20, 22 and at least one outlet port 28, 31, wherein a chemical entering the inlet port 20, 22 flow through a plurality of channels (FIG. 2; column 2, line 65 - column 5, line 3)

With respect to claims 9-10, Masel et al. further disclose that the device may be formed of thin film based quality materials (i.e. coatings), such material being selected according to the

operating temperature, and such material being a silicon based (i.e. silicon carbon) or ceramic (i.e. alumina) material, for example (column 4, lines 5 - column 5, line 35).

With respect to claim 11, Masel et al. further disclose the evaporator/pre-heat section **24** is located substantially adjacent to and gaseously connected to the chamber **16** (FIG. 2; column 3, lines 4-24).

With respect to claim 19, Masel et al. further disclose the device comprises no valves, chemical pumps, pressurized chemical lines or pumps (FIG. 2, 3).

### *Conclusion*

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Ashmead et al. and Förster et al. are provided to illustrate the state of the art.

\* \* \*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is 703-305-4951. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung *JAL*  
February 20, 2003

*Hien Tran*  
**HIEN TRAN**  
**PRIMARY EXAMINER**